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"Is the Average Dividend Tax Rate of Investors Capitalized into Expected Returns?"

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Is the Average Dividend Tax Rate of Investors Capitalized into Expected Returns?

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Is the Average Dividend Tax Rate of Investors Capitalized into Expected Returns?

Abstract:

Capital asset pricing models predict that the dividend tax rate capitalized into expected returns reflects the average tax rate of investors in a market (average rate theory). To date this theory has only limited empirical support. To test this theory, I argue stock markets in developed European countries and the U.S. can be considered an integrated market, where the dividend tax rate capitalized reflects the average rate of investors across these countries. If this is the case, when the top U.S. dividend tax rate was cut by 60% in 2003, the average rate theory would predict a decrease in the dividend tax capitalized in Europe, similar to what has been found in the U.S. (Dhaliwal et al. 2007). In contrast, firms in less integrated European countries should not react to the U.S. dividend tax cut. Finally, I test a prediction from Desai and Dharmapala (2011) that given stock market integration between the U.S. and developed European countries the magnitude of the reaction to the dividend tax cut should be the same. I document results consistent with these predictions, providing support for the average rate theory.

I. Introduction

Beginning with Brennan (1970), researchers have documented that investor-level dividend taxes influence a firm's equity cost of capital (Litzenberger and Ramaswamy 1979; Dhaliwal et al. 2003; Dhaliwal et al. 2005; Dhaliwal et al. 2007; Guenther and Sansing 2010; and Sialm 2009).[1] However, the issue of which investor's tax rate is impounded into expected returns remains unanswered and is the fundamental research question of this paper. Hanlon and Heitzman (2010, 165) suggest answering this question is important as it "will ultimately lead to more powerful empirical tests and more useful inferences" regarding how investor-level taxes affect asset prices.

In addition to showing investor-level taxes influence a firm's cost of equity capital, Brennan (1970) shows that the tax rate capitalized into expected returns depends on the weighted average tax rate of *all* investors in the market (average rate theory). Despite how long ago this second result of the model was derived, there is only limited empirical evidence to support it. For example, Stapleton and Subrahmanyam (1977) find results consistent with the average rate theory but do so with simulated data making the generalizability of their results unclear. The other paper that provides evidence for the average rate theory, Guenther and Sansing (2010), uses actual firm data and finds support using long-horizon stock returns. Guenther and Sansing (2010) suggest support for the average rate theory can also be provided by looking at stock price reactions to tax law changes. Consistent with this suggestion, I test the average rate theory using a substantial change in the U.S. dividend tax law. By using this change setting I seek to complement and strengthen the limited support available for this theory.

I test the average rate theory by examining the stock price reaction of European firms in developed economies to a significant cut in the U.S. dividend tax rate. This rate cut occurred as part of the Jobs and Growth Tax Relief Reconciliation Act of 2003 (the Act) and reduced the top dividend tax

[1] That is, the higher a firm's dividend yield the higher their cost of capital, all else equal. The reason investors require a premium for holding stock of dividend paying firms is that historically rates on dividends have been higher than rates on capital gains. This is referred to as the dividend tax penalty (Dhaliwal et al. 2003).

rate in the U.S. by 60%. I argue that examining European stock returns around a U.S. dividend tax cut is a powerful way to test the predictions of the average rate theory because the stock markets in the U.S. and developed European nations fit the definition of a market in Brennan (1970). [2] If the prediction of the average rate theory is valid, the dividend tax rate capitalized into stock prices before the Act was a combination of investor tax rates across the integrated U.S. and European markets. It follows, therefore, that because the Act decreased the dividend tax rate for a significant portion of investors in the integrated market the average tax rate for the whole market should have decreased. This should lead to a decline in the cost of capital and positive stock returns for dividend paying firms in both the U.S. and Europe. Further, because Brennan (1970) shows the amount of dividend tax capitalized into expected returns is increasing in dividend yield, the reduction in dividend taxes should impact high dividend yield European firms the most. [3]

The primary reason for examining this question in the European setting is it allows me to distinguish the average rate theory from the marginal investor theory. The marginal investor theory predicts the dividend tax rate capitalized is determined by the marginal investor in the firm. [4] It is important to note the marginal investor theory would not predict a positive stock price reaction for European stocks unless on average the marginal investor in European firms is a taxable U.S. investor, which seems highly unlikely.[5] Therefore, finding a positive stock price reaction among high dividend

[2] Brennan (1970) logically defines a market as a pool of securities available to a group of investors. I argue that given the group of investors in the U.S. and integrated European countries can and did hold stocks in each other's stock markets (i.e. they had access to the pool of U.S. and European stocks) they fit the conditions for a market described in Brennan (1970).

[3] A number of papers have documented positive stock returns for U.S. dividend paying firms around the adoption of the Act (Auerbach and Hassett 2006; Amromin et al. 2008; Poterba 2004). This positive reaction was increasing in dividend yield.

[4] Marginal investors are defined as "taxpayers who are indifferent between purchasing two equally risky assets, the returns to which are taxed differently" (Scholes et al. 2005, 142). According to this theory, if the marginal investor is tax-exempt, shareholder-level taxes on dividends should not be capitalized into expected returns.

[5] Table A.1 indicates that taxable U.S. investor ownership in the 10 European countries I examine is low. For example, taxable U.S. investors hold about 2.2% of U.K. market capitalization and 1.3% of Germany and France. Such low ownership makes it doubtful U.S. taxable investors are the marginal investors in European firms.

European firms would be consistent with the average rate theory but inconsistent with the marginal investor theory.

To test the main prediction of my paper, I examine portfolio-level abnormal returns (CARs) for eight events that increased the Act's likelihood of passage.[6] The portfolios are based on dividend yield and created from returns of firms in ten European countries with the longest history of unrestricted capital mobility (Pukthuanthong and Roll 2009; Kaminsky and Schmukler 2003). These ten European countries also make up a large portion of the cross-border equity investing occurring between the U.S. and international countries at the time of the Act. Therefore, the 10 countries and their stock markets are likely well integrated with the U.S. and can be considered a single market.

I find significantly positive CARs for the high-dividend yield portfolio during the event windows, with the CARs decreasing monotonically as dividend yield declines. Also, I find significant positive CARs for the zero-dividend yield firms, consistent with U.S. findings (Auerbach and Hassett 2006; Dhaliwal et al. 2007). To show that the results in the event windows are not due to risk differences between the portfolios, I compare the event CARs to nonevent CARs from the year before the Act was signed. I find the returns for the high, medium, and zero- dividend-yield portfolios are significantly higher in the event windows than in the nonevent windows, consistent with the tax cut increasing returns for dividend paying firms and consistent with the zero-dividend findings in the U.S. However, as expected, I do not find a significant positive difference between event and nonevent CARs for low-dividend yield firms, indicating that in Europe these stocks were not impacted by the dividend tax cut in the U.S. Multivariate analysis that controls for size, market-to-book, country and industry confirms these results.

In addition to the main prediction described above, I also make two cross-sectional predictions. First, firms in European countries whose stock markets are not integrated with the U.S. stock market

[6] These event dates are taken from Auerbach & Hassett (2007).

should not react to the dividend tax cut.[7] In these countries the dividend tax rate capitalized into stock prices before the Act was unlikely to be affected by the tax rate of U.S. investors. Therefore, a U.S. dividend tax cut should not reduce the amount capitalized. Second, I test a prediction made by Desai and Dharmapala (2011) that if the stock markets of integrated European countries and the U.S. are open to foreign investment, and the average rate theory is descriptive, the stock price reaction to the dividend tax cut should be the same in both regions.

To test the cross-sectional predictions, I use multivariate regressions constructed similar to Armstrong et al. (2010). First, I examine whether investors in high dividend firms in nonintegrated European countries reacted to the U.S. dividend tax cut and find they did not. The second cross-sectional test, examining whether the magnitude of the reaction in Europe was the same as the reaction in the U.S., shows that the reactions in the two countries were not significantly different, indicating the tax cut in the U.S. affected the combined U.S. and integrated European markets by the same amount. Overall, these cross-sections provide additional support for the average rate theory.

The main contribution of this paper is to provide empirical support for the model first developed in Brennan (1970) and suggests the tax rate impounded into stock prices is the average tax rate of all investors in a market. The evidence in this paper is inconsistent with the marginal investor theory, suggesting that future research should not use cross-sections based on a firm's marginal investor to validate tax effects.

The results of this paper also inform policymakers. As noted by Dhaliwal et al. (2007), the rationale for the dividend tax cut in the Act was to reduce the cost of equity capital and increase investment.[8] My results suggest that as the capital markets of the world become more integrated a

[7] I use the term nonintegrated while acknowledging there are differing levels of stock market integration between the U.S. and countries in this sample. However, on average, countries designated as nonintegrated have less cross-border equity investment with the U.S. then countries designated as integrated.

[8] John Snow, U.S. Treasury Secretary argued, ''because the President's proposal lowers the cost of capital by reducing the double taxation of capital, it encourages investment and a higher long-term growth rate. Lower

change in investor-level tax rates enacted by a single country will have less effect on a firm's cost of equity capital. This is because the tax rate impounded in expected returns is an average of investors' tax rates across a multi-country market. Unless countries work together to implement shareholder-level tax changes, similar to how they worked together to reduce interest rates in the recent crisis, they may find the firm-level cost of capital reaction to country specific tax changes is less than anticipated (see Appendix A, Table A.3 for examples of this implication).

Finally, the results in this paper provide guidance for academics who seek to study whether dividend tax rate changes are effective. Specifically, researchers will only detect an effect if the dividend tax rate change is large enough to change the tax rate of the multi-country market. Also, researchers will need to determine which countries are included in the market at the time of the change and study outcomes across these countries. This result gives added emphasis to a caution in Hanlon and Heitzman (2010, 166) regarding studying the effect of changes in dividend policy and taxation. They state "that an attempt to infer tax effects based on cross-sectional and time-series variation in U.S. taxes may mischaracterize the effect of taxation if foreign investors and foreign investment matter".

II. Hypothesis Development

Theoretical Development

The theoretical analysis of if and how investor-level taxes influence firm cost of equity capital has a long history. In a seminal paper, Miller and Modigliani (1961) show that dividend policy does not affect firm valuation in a perfect market with no taxes. More directly related to my research question, Brennan (1970) extends their analysis by considering how investor-level taxes influence the valuation of the firm. Building on the Capital Asset Pricing Model (CAPM) of Lintner (1965) and Sharpe (1964),

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capital taxes mean more capital, which means higher productivity, which means faster growth and higher wages for everyone'' (Snow 2003).

Brennan (1970) shows that the expected or required risk premium on a given equity consists of a premium for how the security's return covaries with the market return and a premium for expected dividend yield. Specifically, Brennan (1970) shows that when the tax rates on dividends and interest are equal, but higher than capital gains tax rates (which was the case before the 2003 rate cut), the expected pretax return for stock *j*, $\hat{R}_j$ is given as:

$$\hat{R}_j - r = H\ COV\left(\hat{R}j\ \hat{R}m\right) + T\left(\delta_j - r\right) \quad (1)$$

where r is the pretax return on a riskless taxable asset, $COV\left(\hat{R}j\ \hat{R}m\right)$captures the premium for how the risk characteristics of security *j* covary with the risk characteristics of the market, and δ_j is the dividend yield of stock *j*. And,

$$H = h/(1 - T_g) \quad (2)$$

$$T = (T_d - T_g)/(1 - T_g) \quad (3)$$

where

$$h = \left(\sum_{i=1}^{m} \frac{w_i}{\left(1-t_{g,i}\right)^2}\right)^{-1} \quad (4)$$

$$T_g = \left(\sum_{i=1}^{m} \frac{w_i\, t_{g,i}}{\left(1-t_{g,i}\right)^2}\right)\left(\sum_{i=1}^{m} \frac{w_i}{\left(1-t_{g,i}\right)^2}\right)^{-1} \quad (5)$$

$$T_d = \left(\sum_{i=1}^{m} \frac{w_i\, t_{d,i}}{\left(1-t_{g,i}\right)^2}\right)\left(\sum_{i=1}^{m} \frac{w_i}{\left(1-t_{g,i}\right)^2}\right)^{-1} \quad (6)$$

and $t_{g,i}$ is the capital gains tax rate of investor *i*, $t_{d,i}$ is the dividend tax rate for investor *i*, and w_i represents the risk tolerance of investor *i* and depends on "investors' marginal rates of substitution between expected return and variance of return" (Brennan 1970, 422).[9] T_g and T_d are averages of

[9] The weight is based on investor risk preferences. I assume these risk preferences remain relatively unchanged during the eight events used in my empirical tests.

investors' tax rates on capital gains and dividends, respectively. Also, there are *m* investors in the market.

Brennan's model adds two insights to the CAPM literature. First, it shows that when the dividend tax rate (t_{di}) is higher than the capital gains tax rate ($t_{g,i}$), as was the case in the U.S. (Sialm 2009) and major European countries prior to 2003 (Carroll and Prante 2012), the average tax rate on dividends (T_d) is larger than average tax rate on capital gains (T_g).[10] This causes T in equations (1) and (3) to be greater than zero. For firms with a dividend yield (δ_j) greater than the risk free rate (r) the final term in equation (1) will be positive and leads the expected return to be increasing in dividend yield.[11]

The second insight, and most important for this paper, is "that T_d and T_g are weighted averages of investors' marginal tax rates on dividends and capital gains, where the weights depend upon investors' marginal rates of substitution between expected return and variance of the return" (Brennan 1970, 422). In other words, the tax rate used to capitalize a firm's dividend yield into its expected return is the weighted average tax rate of all investors in a market (average rate theory). While this finding has been known for decades, it has so far received only limited empirical testing. Therefore, in this paper I attempt to provide empirical support for this second insight.[12]

[10] Carroll and Prante (2012) document that in 2000, eight out of the ten countries in the integrated sample had top dividend tax rates that were higher than the top capital gain tax rates. In 2011, the same eight countries still had higher top dividend tax rates. This indicates there is likely a dividend tax penalty across the integrated European/U.S. market.

[11] For comparison purposes, the annual return on One Month Treasury Bills in 2002 (r) was a little over 1.6% (calculated using data from Ken French's website) and the mean dividend yield (δ_j) for the integrated European sample of firms used for the main tests of this paper was 3.2%. This suggests high dividend paying firms likely had a premium built into their stock price prior to the Act.

[12] Recent papers extend the model in Brennan (1970) to include multidimensional stock risk (i.e. 3 risk factors (Fama and French 1992) rather than a single market risk factor (Guenther and Sansing 2010) and the effect of an open-economy (Desai and Dharmapala 2011). Relevant to my study, these extensions still conclude "the dividend tax capitalization effect reflects the weighted average tax rate of all investors, where the weighting depends on investors' risk tolerances" (Guenther and Sansing 2010, p. 849).

Literature Review

A number of studies have examined the first finding in Brennan (1970), that expected returns are positively related to dividend yields, and until recently have found mixed evidence (Litzenberger and Ramaswamy 1979; Miller and Scholes 1982; Blume 1980; Chen et al. 1990; Naranjo et al. 1998). However, recent papers by Dhaliwal et al. (2003), Dhaliwal et al. (2005), Dhaliwal et al. (2007), Guenther and Sansing (2010), and Sialm (2009) provide support for the positive relation.

However, the second finding in Brennan (1970), that the tax rate impounded into asset prices is the weighted average tax rate of all investors in the market, has received far less empirical testing. In fact, only two papers find support for the average rate theory (Stapleton and Subrahmanyam 1977 and Guenther and Sansing 2010) and each has issues that make further study of this question important.

The first paper to document support for the average rate theory is Stapleton and Subrahmanyam (1977). However, the generalizability of this paper is limited because they use simulated firm data. In this paper the authors test the first finding of Brennan (1970), that the cost of capital is increasing in dividend yield, relying on the average rate theory to measure whose rate should be capitalized into the cost of capital. They endow eight simulated firms with an investor base, earnings, risk profiles, dividend yield ratios, and tax rates and find a reduction in dividends leads unambiguously to an increase in price, whatever the clientele of the firm. They also find "the dividend policy effect still depends on the weighted average of all investors' tax rates, although only a few investors hold each stock" (p. 318). While the results in Stapleton and Subrahmanyam (1977) provide support for the average rate theory, the use of simulated data makes the real world applicability of their results unclear. My study overcomes this weakness by using price and financial data for actual firms.

The other paper that provides support for the average rate theory is Guenther and Sansing (2010). This paper attempts to reconcile empirical results that support the marginal investor theory with the average rate theory. The marginal investor theory has been used as an alternative explanation for

which tax rate is impounded into a firm's expected return. Specifically, this theory hypothesizes the tax rate capitalized into firm cost of equity capital is determined by the marginal investor in the firm. This theory is derived using two riskless assets with different tax treatments (Scholes et al. 2005) and implies that if the marginal investor is tax-exempt, shareholder-level taxes on dividends should not be capitalized into stock prices. Therefore, studies have used the level of institutional investors' holdings in a firm's stock as a proxy for whether the marginal investor is tax-exempt. One such study, Dhaliwal et al. (2003), finds there is a positive relation between dividend yield and stock return that is decreasing in the level of institutional ownership, consistent with the marginal investor theory. Other papers find a similar result (Ayers et al. 2002; Dhaliwal et al. 2005; Dhaliwal et al. 2007).

Guenther and Sansing (2010) reexamines these findings and argues the reason firms with high institutional ownership have lower returns is not due to taxes but differences in risk preferences (i.e. institutional investors invest in less risky stocks and therefore have lower expected returns). This means, they argue, that once these differential risk preferences are adequately controlled for the tax result will go away. They provide empirical support for these arguments using long horizon stock returns. However, the Handbook of Corporate Finance states that "inferences from long-horizon tests require extreme caution" due to the inability to control for expected returns over long time periods (Kothari and Warner 2007, 8). Guenther and Sansing (2010) suggest support for the average rate theory can also be provided by looking at stock returns around tax law changes. Consistent with this suggestion, I test the average rate theory using a substantial change in the U.S. dividend tax law. By using this change setting I seek to complement and strengthen the limited support available for this theory.

Hypothesis

The Jobs and Growth Tax Relief Reconciliation Act of 2003 (the Act) provides a powerful setting to test the average rate theory because it involves a significant reduction in the dividend tax rate for the

largest economy in the world. One of the main provisions of the Act cut the top dividend tax rate from 38% to 15%, a 60% reduction.[13] Recent research has examined whether the adoption of the Act lead to an increase in stock prices in the U.S. (due to a reduction in the cost of capital), arguing that such a finding would support the theory that investor-level dividend taxes are capitalized into stock prices (Poterba 2004; Auerbach and Hassett 2006; Dhaliwal et al. 2007). These papers also predict the increase in stock price should be greatest for firms offering a high dividend yield, as these stocks would have had the highest amount of dividend tax capitalized into their stock price before the Act.

In support of these predictions, Poterba (2004) finds an overall gain in U.S. stock market value of 6% around adoption of the Act. Auerbach and Hassett (2006) find a response similar in magnitude to Poterba (2004) when examining the cumulative abnormal returns (CARs) of U.S. firms during eight key events leading up to the adoption of the Act. They also document that this positive stock price reaction is increasing in firm dividend yield, consistent with the prediction in Brennan (1970). Dhaliwal et al. (2007) examine the consequences of the Act by calculating the change in the implied cost of capital for U.S. firms from the quarter before adoption to the quarter after. They find the cost of capital decreases by 1.5% which translates into an annual return between 13% and 21%. Consistent with Auerbach and Hassett (2006), they find the reduction in the cost of capital is increasing in dividend yield. Overall, these results are consistent with the Act lowering the amount of dividend tax capitalized into the price of U.S. stocks.

While this setting has been used to show investor-level taxes impact the cost of equity capital, it can also be used to test the research question of this paper: whether the tax rate impounded is the average tax rate of all investors in the market (Brennan 1970). I test the average rate theory by examining the stock price reaction of European firms during eight event windows leading up to the adoption of the Act. I argue that examining European stock returns around a U.S. dividend tax cut is a

[13] The Act also cut the capital gains tax rate from 20 to 15 percent.

powerful way to test the predictions of the average rate theory because the U.S. and the most developed European economies fit the definition of a market in Brennan (1970). The methodology for defining European countries as integrated or nonintegrated is described in the research method section of this paper.

Given this level of integration, if the prediction of the average rate theory is valid, the dividend tax rate capitalized into stock prices before the Act was the average tax rate of investors across the U.S. and European markets. It follows, therefore, that because the Act decreased the dividend tax rate for a significant portion of investors in the combined market the average tax rate for the whole market should have decreased. This should lead to a decline in the cost of capital and positive stock returns for higher dividend paying firms in both the U.S. and Europe. Finding positive stock returns for high dividend firms in Europe around the adoption of the Act would therefore provide support for the average rate theory. Brennan (1970) further shows the amount of dividend tax capitalized into expected returns is increasing in dividend yield. Therefore, the reduction in the average dividend tax rate should affect the high-dividend yield European firms the most. The dividend tax cut should not affect the low- and zero-dividend yield portfolios because they have dividend yields below the 2002 annual risk free rate meaning the final term in equation (1) is not positive and thus no dividend premium should be capitalized.[14] As a result, I make the formal hypothesis:

H1: *There will be positive abnormal returns for firms in integrated European countries to events that increase the Act's probability of passage, which will be increasing in dividend yield.*

I also make several cross-sectional predictions. First, firms in European countries not integrated with the U.S. should not react to the dividend tax rate cut. The logic for this prediction is similar to hypothesis 1, just reversed. That is, before the Act the dividend tax rate capitalized into stock prices in

[14] Firms in the low-dividend yield portfolio should not react positively to the dividend tax cut because they have an average dividend yield of 1.4%, which is lower than the 2002 annual return on the one month Treasury Bills, which was a little over 1.6% (calculated using data from Ken French's website).

these countries was not impacted by U.S. investors' dividend tax rate, rather, it was determined by the tax rate of the investors that made up that country's market. As a result, a U.S. dividend tax rate cut would not change the average rate in these countries and there should be no reaction. Thus, my second hypothesis is:

H2: *There will not be abnormal returns to events that increase the Act's probability of passage for firms in nonintegrated European countries.*

Finally, I test a prediction made by Desai and Dharmapala (2011) that if the U.S. and developed European markets are integrated, the magnitude of the stock price reaction to the dividend tax cut should be the same in both regions. They derived this prediction using a variation of Brennan's (1970) model where countries across the world are considered to operate in an open-economy. The intuition for this prediction is that if the average dividend tax rate is determined at the combined U.S. and European level then a cut in the U.S. rates would reduce the average rate for the combined market by the same amount. Formally, hypothesis three states:

H3: *The magnitude of the abnormal returns to events that increased the Act's probability of passage will be the same in the U.S. and integrated European countries.*

III. Research Method

Event Dates

All three hypotheses of this paper are tested by examining eight event windows leading up to the adoption of the Act. These event windows were identified in Auerbach and Hassett (2007) by asking Alex Brill, the Senior Economist for the House Ways and Means Committee, to construct a list of important dates leading up to the dividend tax cut. Using these event dates ensures the results documented in this paper are comparable with their paper and generally comparable with results in

other papers documenting stock price reactions to the Act in the U.S. The events are listed in Table 1 and all indicate an increase in the likelihood of the Act passing.

[Insert Table 1 here]

The initial event, a *New York Times* article on December 25, 2002, revealed the Bush Administration would push for a 50% decrease in dividend taxes. On January 7, 2003, in a speech to the Economics Club of Chicago, President Bush officially proposed the elimination of taxes on dividends, a more dramatic cut then was initially suspected. During the February 27 to March 5 event window the plan was introduced in the House and hearings on its impact began. However, the legislation made little progress through March, perhaps due to a shift in focus to a possible war in Iraq.

The idea of a dividend tax cut came back into the news on March 27 when Chairman Thomas of the House Ways and Means Committee offered a plan that would cut the tax rates on dividends and capital gains to 8 and 18 percent, respectively. Chairman Thomas announced an updated version of his plan on April 30. This plan would cut the rates to 5 and 15 percent. This modified plan passed the Ways and Means Committee on May 6 and passed the House on May 9. However, the Senate passed an alternative bill on May 15 that reduced the dividend tax rate to zero percent for one year. Still pushing for a dividend tax cut over a longer period, Chairman Thomas added a sunset provision to his 5 and 15 plan on May 23.[15] This bill passed both the House and the Senate. While different versions of a dividend tax cut were debated during this five-month period, it is important to note that all proposed to cut dividend tax rates substantially more than capital gains tax rates.[16]

[15] The tax rate decrease for dividends was originally set to expire on December 31, 2008. However, it has been extended several times and rates are currently set to rise in December 2012 if no further action is taken.
[16] The 15% rate on dividends applies to qualified dividends for individuals with an ordinary tax rate of 25% or above. For individuals with an ordinary tax rate less than 25%, the dividend tax rate on qualified dividends is 5%. See I.R.S. Publication 550 (2011), 21 for a definition of qualified dividends.

Integrated Foreign Markets

To test whether the average dividend tax rate of investors in the market is impounded into asset prices, I identify a group of countries that are highly integrated with the U.S. market. Pukthuanthong and Roll (2009, 223) identify ten European countries that fit this requirement because they are among "the largest economies and have the longest tradition of free capital mobility" and their stock markets respond to the same set of global factors as the U.S. These countries are Austria, Belgium, Denmark, France, Germany, Ireland, Italy, Netherlands, Switzerland, and the United Kingdom (U.K.). [17] To further support the argument that the stock markets of these European countries and the U.S. are integrated, Tables A.1 and A.2 in Appendix A show the level of cross-border stock purchasing that occurred between them in 2003.[18] For example, Table A.1 shows that about 47% of all foreign portfolio investment by U.S. investors occurs with firms from the ten European countries identified by Pukthuanthong and Roll (2009). Table A.2 shows that 40% of foreign investment in U.S. equities originates in these same ten European countries. Also, research in finance indicates that for these ten European countries explicit barriers to trade such as taxation on international trade in financial assets do not exist in 2003 (Stulz 2005 and Kaminsky and Schmukler 2003). Overall, these results suggest that the largest economies in Europe were well integrated with the U.S. stock market in 2003.

Event Study Methodology

Test of Hypothesis 1

Because Brennan (1970) shows dividend tax capitalization is increasing in dividend yield I examine stock returns around the eight event windows separately for portfolios of firms based on

[17] This is not to say that the only countries with stock markets integrated with the U.S. are from Europe. However, Europe accounts for a large portion of cross-border equity investing with the U.S. See Tables A.1 and A.2 for details. In addition, Pukthuanthong and Roll (2009) show the returns in Europe and the U.S. respond to common global factors, suggesting a high degree of integration.

[18] Foreign portfolio investment data is available at www.treas.gov/tic/ and has been used in the economics literature (Desai and Dharmapala 2011).

dividend yield. Specifically, following Amromin et al. (2008), firms that paid dividends are sorted into quartiles based on their dividend yield (defined as the ratio of dividends per share paid in 2002 to end of 2002 stock price). Firms in the top quartile are defined as high-dividend. Firms in the bottom quartile are defined as low-dividend, while those in the middle two quartiles make up the medium-dividend group. The final group, zero-dividend, is made up of firms that don't pay a dividend in 2002.

To control for varying risk characteristics across firms, stock performance is assessed using abnormal returns using a five-day window which is centered on the event date. These abnormal returns are calculated by first estimating beta using the single-factor market model:[19]

$$r_{i,t} - r_{F,t} = \propto + \beta_{i,t}^{M}(r_{M,t} - r_{F,t}) + \varepsilon_{i,t} \quad (7)$$

and the abnormal return is calculated as the predicted errors following Zhang (2007):

$$AR_{i,t} = (r_{i,t} - r_{F,t}) - (\bar{\alpha} + \bar{\beta}_{i,t}^{M}(r_{M,t} - r_{F,t})) \quad (8)$$

where $r_{i,t}$ is the value-weighted return for portfolio *i* on day *t*. The variable $r_{F,t}$ is defined as the risk-free rate of return on day *t*, while $r_{M,t}$ is the value-weighted market return on day *t*, and $\beta_{i,t}^{M}$ is the portfolio's market beta estimated using return data from calendar year 2002. The abnormal return ($AR_{i,t}$) is calculated by subtracting portfolio *i's* expected return on day *t* ($\bar{\alpha} + \bar{\beta}_{i,t}^{M}(r_{M,t} - r_{F,t})$) from the realized return on day *t* ($r_{i,t} - r_{F,t}$). The abnormal returns for portfolio *i* are then cumulated over the five day event window *k* to form the event window cumulative abnormal return ($CAR_{i,k}$).

Another reason for using portfolios is event windows perfectly overlap in time for each firm in the sample, meaning there is likely contemporaneous correlation of returns across stocks. This affects how to correctly test the cumulative abnormal returns of each dividend yield group for statistical significance. Mandelker (1974) and Jaffe (1974) develop a simple way to overcome the problem which

[19] Calculating abnormal returns using the market model, as opposed to a multi-factor model, is consistent with other recent international event studies such as Armstrong et al. (2010). However, I also run my multivariate tests (equations 11 and 12) controlling for size and value premiums (Fama and French 1992). Results are unchanged when substituting these controls for the *Size* and *Market-to-Book* controls. I thank Ken French for making the European region factors available on his website.

suggests aggregating "individual stock returns into dividend-yield portfolios and then carrying out the estimation of Equations [(7) and (8)] at the portfolio level. This approach allows for cross-correlation of abnormal returns and generates appropriate standard errors for testing the null hypothesis of positive *CARs*" (Amromin et al. 2008, 637). The t-statistic used to calculate whether the *CARs* are significantly different from zero is:

$$CAR_{i,k}/(\frac{SD_i}{\sqrt{n_k}}) \tag{9}$$

where $CAR_{i,k}$ is the cumulative abnormal return for portfolio *i* from event window *k*, SD_i is the standard deviation of the beta calculation for portfolio *i* from the estimation period, and $\sqrt{n_k}$ is the square root of the number of days in event *k*s window. I predict the reaction to the dividend tax cut will be highest for the high-dividend yield portfolio and monotonically decreasing until there is no reaction for the zero-dividend yield portfolio.

To show that the results in the event windows are not due to risk differences between the portfolios, I compare the event CARs to a sample of nonevent CARs. Specifically, equations (7) and (8) are calculated for each five-day window that does not overlap with event windows going back one year from the date the Act was signed (May 2002 to May 2003). The mean of the nonevent cumulative abnormal returns is then compared to the mean of the event window abnormal returns for each portfolio using the following t-statistic:

$$\frac{CAR_{i,event} - CAR_{i,non-event}}{SD_i * \sqrt{\frac{1}{n_1}+\frac{1}{n_2}}} \tag{10}$$

where $CAR_{i,event}$ is the mean cumulative return over all eight event windows for portfolio *i,* $CAR_{i,non-event}$ is the mean cumulative return over all 37 nonevent windows for portfolio *i,* SD_i is the standard deviation of the beta calculation for portfolio *i* from the estimation period, $n1$ is eight (for the eight event windows) and $n2$ is 37 (for the 37 nonevent windows). I predict the returns for the high and

medium dividend yield portfolios will be significantly higher in the event windows then the nonevent windows.

In addition to the portfolio tests, hypothesis 1 is tested using the following multivariate regression, which is similar to the regressions used in Armstrong et al. (2010):

$$CAR_{i,k} = \beta_0 + \beta_1 DividendYield_{i,t} + \beta_2 ZeroDividend_{i,t} + \beta_3 Size_{i,t} + \beta_4 Market - to - Book_{i,t} + \varepsilon_{i,t} \quad (11)$$

where $CAR_{i,k}$ is the cumulative abnormal return for firm *i* during event window *k*. $DividendYield_{i,t}$ is calculated as 2002 dividends per share divided by end of 2002 stock price for firm *i* and is the main variable of interest in the regression. $ZeroDividend_{i,t}$ is 1 if firm *i* did not pay a dividend in 2002, and 0 otherwise.[20] This variable is included because existing research finds U.S. zero-dividend paying firms reacted strongly to the Act (Dhaliwal et al. 2007, Auerbach and Hassett 2007, and Amromin et al. 2008). However, I predict $ZeroDividend_{i,t}$ will be insignificantly related to returns during the event window based on model derived in Brennan (1970). $Size_{i,t}$ is the log of market value of equity for firm *i* at the end of the most recent fiscal year and is included because over long periods of time small firms have higher abnormal returns (Fama and French 1993). $Market - to - Book_{i,t}$ is the market value of equity divided by book value of equity for firm *i* at the end of the most recent fiscal year and is included because value firms have higher expected returns over long time periods (Fama and French 1993). However, it is unclear whether these variables are important in short-window event studies. I predict $\beta_1$will be positive and significant. While the value-weighted portfolios capture the impact of the U.S. dividend tax cut on the largest European firms, the multivariate regression allows each observation to have equal weight and calculates an on average effect. Fama and French (2008) discuss how using both methods provide more confidence in the results.

[20] Dhaliwal et al. (2003) include continuous and indicator variables for dividend yield in their regressions. In my tests, the variance inflation factors (VIFs) and condition index for equation (11) are below two and three, respectively, indicating that including both variables does not lead to significant multicollinearity.

I also compare event *CARs* to nonevent *CARs* in a multivariate setting. This is done using the following equation:

$$CAR_{i,k} =$$

$$\beta_0 + \beta_1 DividendYield_{i,t} + \beta_2 Event_{i,k} + \beta_3 DividendYield_{i,t} * Event_{i,k} + \beta_4 ZeroDividend_{i,t} +$$

$$\beta_5 ZeroDividend_{i,t} * Event_{i,k} + \beta_6 Size_{i,t} + \beta_7 Market - to - Book_{i,t} + \varepsilon_{i,t} \quad (12)$$

where $CAR_{i,k}$ $DividendYield_{i,t}$, $ZeroDividend_{i,t}$, $Size_{i,t}$, *and* $Market - to - Book_{i,t}$ are defined as in equation (11) and $Event_{i,k}$ is equal to one if the *CAR* for firm *i* relates to one of the *k* (eight) event windows that increased the likelihood of the Act's passage, and zero otherwise. I predict β_3 will be positive and significant.

Test of Hypothesis 2

Hypothesis 2 predicts that firms in European countries with stock markets that are not integrated with the U.S. stock market will not have a significant reaction to the U.S. dividend tax cut. I define nonintegrated countries as all European countries included in Pukthuanthong and Roll (2009) except the ten countries they identify as most integrated with the U.S. These countries are Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Finland, Greece, Hungary, Iceland, Latvia, Lithuania, Luxembourg, Malta, Norway, Poland, Portugal, Romania, Russia, Slovak Republic, Slovenia, Spain, Sweden, and Turkey.[21] The following regression is used to test H2:

[21] An official list of European countries can be found at http://europa.eu/about-eu/countries/index_en.htm.

$$CAR_{i,k} =$$

$$\beta_0 + \beta_1 NonIntegrated_{i,t} + \beta_2 DividendYield_{i,t} + \beta_3 NonIntegrated * DividendYield_{i,k} + \beta_4 ZeroDividend_{i,t} + \beta_5 NonIntegrated_{i,t} * ZeroDividend_{i,k} + \beta_6 Size_{i,t} + \beta_7 NonIntegrated_{i,t} * Size_{i,t} + \beta_8 Market - to - Book_{i,t} + \beta_9 NonIntegrated_{i,t} * Market - to - Book_{i,t} + \varepsilon_{i,t} \quad (13)$$

where $NonIntegrated_{i,t}$ is one if the firm is headquartered in a country that is not considered integrated with the U.S., and zero otherwise and all other variables are as previously defined. H2 predicts that $\beta_2 + \beta_3$ will be insignificantly different from zero.

Test of Hypothesis 3

Hypothesis 3 predicts that the magnitude of the reaction in the U.S. and integrated European countries will be the same because they operate in integrated economies. The following regression is used to test H3:

$$CAR_{i,k} =$$

$$\beta_0 + \beta_1 USFirm_{i,t} + \beta_2 DividendYield_{i,t} + \beta_3 USFirm * DividendYield_{i,k} + \beta_4 ZeroDividend_{i,t} + \beta_5 USFirm_{i,t} * ZeroDividend_{i,k} + \beta_6 Size_{i,t} + \beta_7 USFirm_{i,t} * Size_{i,t} + \beta_8 Market - to - Book_{i,t} + \beta_9 USFirm_{i,t} * Market - to - Book_{i,t} + \varepsilon_{i,t} \quad (14)$$

where $USFirm_{i,t}$ is one if the firm is headquartered in the U.S., and zero if it is headquartered in an integrated European country. All other variables are as previously defined. H3 predicts that β_3 will be insignificantly different from zero.

IV. Results

Sample

To test hypothesis 1, I obtain foreign stock return, dividend yield, and market values from COMPUSTAT Global. I retain firms in the sample if they are headquartered in one of the ten European countries identified above. Additionally, I require firms to have at least 200 daily returns in 2003. This restriction ensures only liquid firms where a reaction to new information can be observed are kept in the sample. I also eliminate firms with a stock unit price less than one on any of the event dates (Zhang 2007) to alleviate the low-priced stock problem where small price movements can cause extreme returns. In addition, I require firms to have at least one return in each of the eight event windows to ensure a consistent sample of firms across the dates of interest.

Returns are calculated using the change in stock price in local currency from day *t-1* to day *t*. To make market values comparable, a firm's market value is transformed into U.S. dollars using the daily exchange rate from the COMPUSTAT Global Exchange Rate Daily File, similar to Zhang (2007). The market capitalization of each firm in a given portfolio on day *t-1* is used to compute the weight of that firm's returns in the portfolio in day *t*. After making these requirements 2,340 unique firms are captured in the sample for the portfolio tests.

I construct the samples for the multivariate regressions using the same data restrictions as the portfolio sample. In addition, a firm must have all control variables to be included in the sample. Finally, all continuous independent variables are truncated at 1 and 99 percent to reduce the influence of outliers. This leads to a sample of 1,490 firms in integrated European countries.

Descriptive Statistics

Table 2 Panel A shows the number of firms from each country included in the portfolio sample. Consistent with prior literature, France, Germany and the U.K. make up a large portion of the sample

(Armstrong et al. 2010; Zhang 2007). Table 2 Panel B shows how the firms in each country are spread across dividend yield portfolios.

[Insert Table 2 here]

Table 3 shows descriptive statitistics for the sample of firms used in the porfolio tests. Panel A provides mean and median 2002 dividend yield and ending market value of equity in U.S. dollars (USD) for each of the dividend yield portfolios. Similar to findings in the U.S., firms in the no-dividend portfolio are smaller than dividend paying firms and firms in the high-dividend yield portfolio are smaller than the medium- and low-dividend yield portfolios (Amromin et al. 2008). Also, consistent with findings in the business press and academic research, dividend yield is higher in Europe than in the the U.S. (Blitz et al. 2010; Hough 2012). For example, the median yield for European firms in the high dividend portfolio is 6.8%, whereas the median yield for the high dividend portfolio of U.S. firms documented in Amromin et al. (2008) is 3.8%.

[Insert Table 3 here]

Panel B of Table 3 provides the estimated portfolio betas from equation (7). These betas are calculated by regressing daily value-weighted portfolio return on the daily value-weighted European market return. The market return used is the Morgan Stanley Capital International (MSCI) Europe Index.[22] Promotional material describes this index as a market capitalization weighted index that is designed to measure the equity market performance of the developed markets in Europe.[23] [24] Table 3

[22] I also run equation (11) with CARs for a combined sample of all available U.S. and European firms. I use the STOXX Global 1800 ex Asia/Pacific (i.e. it only has returns for U.S. and European companies) as the market return when calculating firm-level abnormal returns. Coefficient sizes and significance on main independent variables are unchanged from the original analysis (*Dividend Yield* coefficient = 0.185, p-value < 0.01).

[23] More detail about the MSCI Europe Index can be obtained at http://www.msci.com/products/indices/tools/index.html#EUROPE. It consists of the following 16 developed market country indices: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom, which are all included in my sample of 11 European countries. Even though all of these countries are considered developed, I follow Pukthuanthong and Roll (2009) when determining which countries are integrated with the U.S.

[24] Armstrong et al. (2010) use the value-weighted daily returns of all firms in the Datastream database as an alternative way to measure the European market return. They find the Pearson correlation between the MSCI

Panel B shows the beta for the high-dividend yield portfolio is close to 1 and that the medium, low, and no-dividend yield portfolios are less than one.

Table 4 shows descriptives for the 1,490 firms (11,920 firm-event observations) from the ten integrated European countries in the multivariate sample. This sample is smaller than the sample used in the portfolio analysis due to the requirements for control variables. Panel A shows the sample contains reasonably large firms (mean *Size* = 5.341) that have an average dividend yield of 2.8%. About 30% of the observations in the sample do not pay dividends. It also shows that the mean abnormal return over the event windows was .9%. Panel B shows the Pearson correlations and as expected the event period cumulative abnormal returns are positively related to dividend yield although the relation is not significant. There is, however, a positive correlation between the dummy variable for firms that do not pay dividends and the event period cumulative abnormal returns. While this correlation would not be predicted by the model in Brennan (1970) it is consistent with the strong reaction leading up to the passage of the Act documented in the U.S. (Auerbach and Hassett 2007).

[Insert Table 4 here]

Main Results

Results for Hypothesis 1

Table 5 Panels A through H document the cumulative raw return, CAR, and cumulative European market return for the eight event windows detailed in Table 1. For six of the eight event windows the CAR for the high-dividend portfolio is greater than the CARs for the medium and low-dividend portfolios. Panel I shows the mean CAR across all eight windows is monotically increasing in dividend yield

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European Index and their alternative measure is 0.993, indicating MSCI is a good proxy for the market return. To further show that COMPUSTAT Global is capturing a similar sample to Datastream, I correlate the value-weighted daily returns for 2002 with the MSCI index. Finding a high correlation with MSCI would indicate COMPUSTAT Global contains similar firms to Datastream. I find a Pearson correlation of .994 between the returns of all firms in COMPUSTAT Global and the MSCI Europe Index.

portfolio, with a -0.2% return for the low-dividend yield portfolio and a 0.9% CAR for the high-dividend yield portfolio. The difference between the mean abnormal returns of the high- and low-dividend yield portfolios is significant (p-value = 0.044, two tailed). These results suggest the average dividend tax rate of investors in the integrated European and U.S. market are being reduced as a result of the 2003 U.S. tax cut. The CARs for the high- and medium-dividend yield portfolio are significantly different from zero (p-values of <0.01 and <0.05, respectively) and are economically large (mean event abnormal returns of 0.9% and 0.3%, respectively). It is also important to note that the zero-dividend portfolio has CARs of similar magnitude to the high-dividend yield portfolio. Similar findings during the event period have been documented in Dhaliwal et al., (2007), Auerbach and Hassett (2007), and Amromin et al. (2008).

[Insert Table 5 here]

To further investigate whether the results in the event windows could be due to risk differences between the portfolios, I compare the event CARs to nonevent CARs from the year before the Act was signed. This is important because Table 3 Panel A shows that the high and zero yield firms are smaller than the low and medium dividend yield firms. If investors demand a premium for investing in smaller firms, similar to the U.S., then the abnormal returns could simply be a reflection of this fact (Fama and French 1993). If abnormal returns are higher in the event window than the nonevent window, this concern is alleviated. Table 6 shows the results of comparing the event and nonevent windows by examining the mean return across the event and nonevent windows. Panel A shows the mean returns by dividend portfolio from the event windows. This is the same as Panel I in Table 5 and is replicated to better compare the event and nonevent abnormal returns. Table 6, Panel B shows the mean returns by dividend yield portfolio for the nonevent window. Panel C compares the coefficients from Panels A and B. As can be seen in Panel C, the mean abnormal returns for the high-, medium-, and zero-dividend yield portfolios are significantly higher during the event windows. As expected, the abnormal returns for the low-dividend yield portfolio are not significantly different in the event windows than in the nonevent

windows. These results are consistent with my argument that investors had been demanding a higher return for dividend paying stocks in Europe at an average market rate of the combined U.S. and integrated European market. Once the average dividend tax rate declined due to the dividend tax rate cut in the U.S., the combined U.S. and European average tax rate decreased resulting in abnormal stock returns in both the U.S. and Europe. Therefore, my results provide support consistent with the average tax rate theory, as derived by Brennan (1970). The zero-dividend yield result is consistent with results looking at abnormal reactions to the Act found in the U.S. (Dhaliwal et al., 2007, Auerbach and Hassett 2007, and Amromin et al. 2008). Auerbach and Hassett (2006) suggest that the zero-dividend result may occur because these firms will be able to pay dividends at lower rates and that any new issues of stock will sell at a higher price (because those shares face a lower tax rate on future dividends) due to the dividend tax cut. In this way zero-dividend firms get a double benefit from the tax cut, which could lead to an abnormally high stock price reaction around the adoption of the Act.

[Insert Table 6 here]

Tables 7 and 8 present the results of equations (11) and (12), which test hypothesis 1 using a multivariate model. As predicted, Table 7 shows a positive and significant relation between the event period abnormal returns and dividend yield (coefficient = 0.148, p-value = <0.01), even after controlling for size and the market to book ratio of the firm and including country and industry fixed effects. There was also a significant reaction for the firms that did not pay dividends, indicating that the U.S. tax cut did impact these stocks, similar to what has been documented in the U.S. *Size* loads negative consistent with expectations however the *market-to-book* coefficient is positive, which is inconsistent with expectations but consistent with prior research (Zhang 2007). Table 8 presents evidence that the return in the event window was greater than in the nonevent window. Specifically, the interaction of dividend yield with the event dummy is positive and significant (coefficient = 0.146, p-value = <0.01). The result for *ZeroDividend* in the multivariate regression is inconsistent with the result in the portfolio analysis,

meaning abnormal returns are insignificantly positive in the nonevent period (coefficient = 0.008, p-value = 0.22) and not signficantly higher in the event period (coefficient = -0.002, p-value = 0.86).[25] *Size* is negative and insignificant whereas *Market-to-Book* is positive and insignificant in this regression, inconsistent with expectations. This may occur because over short periods of time the relation between these variables and abnormal returns may not be the same as the long-window results documented in Fama and French (1993). Overall, the results from the portfolio and multiple regression analysis provide support for hypothesis 1.

[Insert Tables 7 and 8 here]

Results for Hypothesis 2

Hypothesis 2 predicts that firms in nonintegrated countries will not react to the U.S. dividend tax rate cut. Table 9 provides descriptive statistics for the sample of nonintegrated firms. This sample contains 491 firms (3,928 firm-event observations). The number of observations is lower because the nonintegrated countries have fewer firms included in COMPUSTAT Global. In untabulated results, I compare the descriptive statistics of the integrated and nonintegrated European countries (Table 9 Panel A compared to Table 4 Panel A). This analysis reveals that firms in the nonintegrated countries had insignificantly different abnormal returns during the event windows but are on average significantly smaller, pay less dividends, and have lower market-to-book ratios. There are also significantly more zero-dividend firms in the nonintegrated sample. Panel B, Table 9, shows that there is a negative and significant correlation between abnormal returns and dividend yield during the event period (p-value =

[25] Fama and French (2008) argue that microcap firms could dominate cross-sectional regressions on all stocks. To see what impact they have on this regression, firms with less than $272 million in market capitalization are dropped from the regression (the $272 million cut off is determined at December, 2002 using Fama and French's (2008) definition of microcaps: stocks with market cap below the 20th NYSE percentile). Dropping these firms changes the interaction of the zero dividend dummy and the event dummy to be positive and significant, consistent with the results in the portfolio analysis. All other variables in the regression are unchanged when microcaps are dropped. I also rerun all other equations (11, 13, and 14) after dropping microcap firms and find results are unchanged.

<0.05), inconsistent with the integrated firms reacting to the U.S. dividend tax cut. Table 10 reports multivariate results using equation (13) on the sample of 15,848 firm-event observations (11,920 from the integrated sample and 3,928 from the nonintegrated sample). The coefficient on the dividend yield variable is positive and significant and the interaction of nonintegrated and dividend yield is negative but insignificant. Adding $\beta_2 + \beta_3$ yields a coefficient of 0.06 and a joint test p-value of 0.12 indicating that the association between dividend yield and the nonintegrated dummy is not different than zero during the event window, consistent with hypothesis 2.

[Insert Tables 9 and 10 here]

Results for Hypothesis 3

Tables 11 and 12 show the results for tests of hypothesis 3, which is the reaction to the dividend tax cut will be of the same magnitude in integrated European countries and the U.S. Table 11 shows descriptive information for the 3,602 U.S. firms included in the sample (28,780 firm-event observations).In untabulated results, I compare the descriptive statistics in Table 11, Panel A to that in Table 4, Panel A. This reveals that the mean CAR during the event window was significantly larger for firms in the integrated European countries than in the U.S. This might have occurred because European firms have higher dividend yields and therefore the average premium capitalized into asset prices before the tax rate cut would have been higher than in the U.S. Therefore, the rate cut should have led to a greater increase in price and higher abnormal returns in Europe. This comparison between the integrated European and U.S. samples also shows that European firms in my sample were smaller and had higher dividend yields than the firms in the U.S. sample. Also, U.S. firms are less likely to pay dividends and have higher market-to-book ratios. Panel B shows the correlations for U.S. firms and they are generally as expected except there is a negative relation between dividend yield and the cumulative abnormal returns. This may be due to the previously documented result that both high- and no-dividend

yield firms had significant abnormal returns during the event period and that the returns were higher for zero-dividend firms in the U.S. (Auerbach and Hassett 2007; Dhaliwal et al. 2007; Amromin et al. 2008). Consistent with this there is a positive correlation between event cumulative abnormal returns and firms that pay zero dividends.

Table 12 shows the results of estimating equation (14) for the pooled sample of firms (28,780 observations of U.S. firms and 11,920 observations of integrated European firms). Consistent with prior research about the reaction of U.S. firms to the 2003 tax Act dividend tax rate cut, I show that there were positive and significant abnormal returns for U.S. firms ($\beta_2 + \beta_3$: coefficient = 0.212, p-value = <0.01). Consistent with H3, β_3 is not signficant (p-value = 0.31) indicating that returns for dividend paying firms in the U.S. were not significantly greater than returns for dividend paying firms in integrated European countries. However, the results show that for zero-dividend U.S. firms returns were significantly higher during the event window. Because the zero-dividend firms contain many microcap firms, which Fama and French (2008) argue could dominate cross-sectional regressions on all stocks, I drop them to see what impact they have on this regression. In untabulated results, I find that when microcaps are dropped the coefficient on *USFirm* and *ZeroDividend* becomes insignificant (coefficient = 0.002, p-value = 0.69) while the coefficients on *DividendYield* and *ZeroDividend* remain positive and significant and the interaction of *USFirm* and *DividendYield* remains insignificant. This indicates that when microcap firms are dropped the abnormal returns for zero-dividend firms are not statistically different in the U.S. and Europe. Overall, these results provide support for the open market CAPM in Desai and Dharmapala (2011) and indicate that the tax rate capitalized into expected returns is the average tax rate of all investors in the market.

[Insert Tables 11 and 12 here]

V. Conclusion

In this paper I test the theory that the dividend tax capitalized into stock prices is the weighted average tax rate of all investors in the market (Brennan 1970). I do this by arguing that 10 European countries and the U.S. can be considered an integrated market and predict that if the average rate theory is accurate, a 2003 reduction in dividend taxes in the U.S. should also lead to a reduction in the dividend tax capitalized into asset prices in these integrated European countries. Using both portfolio analysis and multivariate regressions, I document a significantly positive reaction to the U.S. dividend tax cut for European firms, consistent with the average rate theory. As expected, these abnormal returns are increasing in dividend yield. Two cross-sectional test further confirm the theory. First, I show that investors in nonintegrated European countries did not respond to the U.S. dividend tax cut. Second, I show that the magnitude of the reaction to the Act in the U.S. and Europe was not significantly different, as predicted by Desai and Dharmapala (2011). These findings indicate that the tax rate impounded into stock prices is the average tax rate of all investors in the market.

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Table 1
Key Event Dates Leading to Adoption of the Jobs and Growth Tax Relief Reconciliation Act of 2003

Event #	Event Date	Event Window	Description
1	12/25/2002	12/23 - 12/30	NYT Article revealing Bush[1] administration would push for 50% dividend rate cut.
2	1/7/2003	1/3 - 1/9	Bush announces plan to completely eliminate dividends.
3	2/27/2003 & 3/4/2003	2/27 - 3/5	Bush plan Introduced into House. House undertakes first hearing on Bush Plan.
4	3/27/2003	3/25 - 3/31	After little progress made in March, Chairman Thomas[2] floats plan that would cut dividends and capital gains to 8 and 18 precent, respectively.
5	4/30/2003	4/28 - 5/2	Chairman Thomas updates plan to change dividend and capital gains to 5 and 15 percent, respectively.
6	5/6/2003 & 5/9/2003	5/6 - 5/12	Ways and Means passes Chairman Thomas' 5 and 15 percent plan. House passes this plan.
7	5/15/2003	5/13 - 5/19	Senate passes alternative plan that would make dividend taxes zero for one year.
8	5/23/2003	5/21 - 5/28	Chairman Thomas adds sunset provision to his 5 and 15 percent plan. This passes House and Senate.

This table presents the eight events leading up to the adoption of the Jobs and Growth Tax Relief Reconciliation Act of 2003 (the Act). All events indicated the probability of a dividend tax cut was increasing. These event windows were identified in Auerbach and Hassett (2007) by asking Alex Brill, the Senior Economist for the House Ways and Means Committee, to construct a list of dates on which important news concerning the potential dividend tax cut was released to the public. Event windows cover the five days surrounding the event (two trading days before the event, the event date, and two trading days after the event).

[1]Bush refers to George W. Bush.

[2]Chairman Thomas refers to Bill Thomas, Chairman of the House Ways and Means Committee.

Table 2

Sample Composition for 10 European Countries in the Portfolio Analysis

Panel A - Distribution of European Firms by Country

	# of Firms	% of Total Obs.
Austria	51	2%
Belgium	86	4%
Denmark	85	4%
France	491	21%
Germany	559	24%
Ireland	23	1%
Italy	186	8%
Netherlands	145	6%
Switzerland	181	8%
United Kingdom	533	23%
Total	2,340	100%

Panel B - Breakdown of Country Representation in Each Dividend Yield Portfolio

	High-Dividend Yield Firms	% of High Dividend Obs.	Medium-Dividend Yield Firms	% of Medium Dividend Obs.	Low-Dividend Yield Firms	% of Low Dividend Obs.	Zero-Dividend Yield Firms	% of Zero Dividend Obs.
Austria	6	1%	16	2%	10	2%	19	3%
Belgium	26	6%	26	3%	13	3%	21	3%
Denmark	5	1%	21	3%	22	5%	37	5%
France	57	14%	178	22%	99	24%	157	23%
Germany	107	26%	137	17%	61	15%	254	37%
Ireland	3	1%	11	1%	6	1%	3	0%
Italy	23	6%	72	9%	44	11%	47	7%
Netherlands	49	12%	42	5%	18	4%	36	5%
Switzerland	23	6%	60	7%	31	8%	67	10%
United Kingdom	113	27%	264	32%	107	26%	49	7%
Total	412	100%	827	100%	411	100%	690	100%

Panel A presents the sample composition by country. The sample includes all European firms from the 10 largest and most developed economies in Europe that have at least 200 daily returns in 2003, have a unit stock price greater than or equal to one (Zhang 2007), and have at least one return in each of the eight event windows.

Panel B breaks down the country-level make up of each of the dividend yield portfolios. Dividend yield is calculated as total dividends per share in 2002 divided by end of calendar year 2002 stock price. These portfolios are formed by separating the dividend paying stocks into quartiles based on dividend yield. The firms in the top quartile, middle two quartiles, and bottom quartile make up the high-, medium, and low-dividend yield portfolios, respectively. Firms that do not pay dividends are assigned to the zero-dividend yield portfolio.

Table 3
Descriptive Statistics for the Dividend-Yield Portfolios

Panel A. Firm Characteristics, by Dividend-Yield Portfolio

Portfolio	Number of Firms	Mean		Median	
		Dividend Yield (Percentage)	MVE ($Million)	Dividend Yield (Percentage)	MVE ($Million)
High-Dividend	412	9.1%	2,252	6.9%	172
Medium-Dividend	827	3.5%	2,869	3.5%	300
Low-Dividend	411	1.4%	2,946	1.4%	371
Zero-Dividend	690	0.0%	370	0.0%	46

Panel B. Estimated Beta Loadings, by Dividend-Yield Portfolio

Portfolio	Value-Weighted Portfolio
	Market Beta
High-Dividend	1.00
Medium-Dividend	0.86
Low-Dividend	0.88
Zero-Dividend	0.92

Panel A presents descriptive statistics for the 2,340 European firms in the sample, subdivided by dividend yield. Dividend yield is calculated as total dividends per share in 2002 divided by end of calendar year 2002 stock price. These portfolios are formed by separating the dividend paying stocks into quartiles based on dividend yield. The firms in the top quartile, middle two quartiles, and bottom quartile make up the high-, medium, and low-dividend yield portfolios, respectively. Firms that do not pay dividends are assigned to the zero-dividend yield portfolio. Market value of equity (MVE) is calculated as shares outstanding multiplied by end of day stock price at the end of calendar year 2002 and is reported in U.S. dollars.

Panel B reports the estimated market factor for each dividend yield portfolio. This estimation is based on daily portfolio returns for the year 2002 using the following equation:

$$r_{i,t} - r_{F,t} = \propto + \beta_{i,t}^{M}\left(r_{M,t} - r_{F,t}\right) + \varepsilon_{i,t}$$

where $r_{i,t}$ is the value-weighted return of portfolio *i* on day *t*, $r_{F,t}$ is the riskfree return *F* on day *t*, and $r_{M,t}$ is the value-weight market return on day *t*. The MSCI Europe Index is used as the European value-weighted market return.

Table 4

Descriptive Statistics For the Integrated European Sample Used in Multivariate Tests

Panel A - Descriptive Statistics

Variable	Sample Size	Mean	Median	Std. Dev.	25th	75th
CAR	11,920	0.009	0.003	0.073	-0.020	0.032
DividendYield	11,920	0.028	0.023	0.028	0.000	0.043
ZeroDividend	11,920	0.299	0.000	0.458	0.000	1.000
Size	11,920	5.341	5.142	1.876	3.911	6.523
Market-to-Book	11,920	2.294	1.661	2.001	1.054	2.740

Panel B - Pearson Correlations

	CAR	*DividendYield*	*ZeroDividend*	*Size*
CAR				
DividendYield	0.0168			
ZeroDividend	**0.0180**	**-0.6364**		
Size	-0.0159	**0.1472**	**-0.3580**	
Market-to-Book	**0.0261**	**-0.1053**	**-0.0492**	**0.29018**

Panel A reports descriptive statistics for the firms located in integrated European countries. The sample contains one cumulative abnormal return (*CAR*) per firm for each of the the eight event windows and is comprised of 1,490 firms. *CAR* is calculated as the firm's risk adjusted return on day *t* less the expected return on day *t,* cumulated over the five day event window. A firm's expected return is calculated as $\bar{\alpha}_i + \bar{\beta}_i^M \left(r_{M,t} - r_{F,t}\right)$ where $\bar{\alpha}_i$ and $\bar{\beta}_i^M$ are estimated using 2002 daily return data and the following equation:

$r_{i,t} - r_{F,t} = \propto + \beta_{i,t}^M \left(r_{M,t} - r_{F,t}\right) + \varepsilon_{i,t}$

where $r_{i,t}$ is the value-weighted return for portfolio *i* on day *t*. The variable $r_{F,t}$ is defined as the risk-free rate of return on day *t*, while $r_{M,t}$ is the value-weighted market return on day *t*. The MSCI Europe Index is used as the European value-weighted market return.

Dividend Yield is calculated as 2002 dividends per share divided by end of 2002 stock price. *ZeroDividend* is 1 if the firm paid no dividends in 2002, and 0 otherwise. *Size* is the log of market value of equity at the end of the firms most recent fiscal year. *Market-to-Book* is the market value of equity divided by book value of equity at the end of the firms most recent fiscal year.

Panel B reports the Pearson correlations. Correlation coefficients that are significantly different from zero at less than 5% are presented in bold.

Table 5
CARs of Firms in Integrated European Countries by Dividend Portfolio and Event Date - Market Model

Portfolio	Value-Weighted Portfolios			
	1 Cumulative Return	2 CAR	3 Cumulative Market Return	
Panel A. Dec. 23-30, 2002 Event Window				**Description of Event 1**
High-Dividend	-1.2%	0.7% ***	-1.8%	NYT Article revealing Bush administration would push for 50% dividend rate cut.
Medium-Dividend	-0.5%	1.0% ***		
Low-Dividend	-1.5%	0.1%		
Zero-Dividend	-2.6%	-0.8%		
Panel B. Jan. 3-9, 2003 Event Window				**Description of Event 2**
High-Dividend	-0.4%	0.6% **	-0.8%	Bush announces plan to completely eliminate dividends.
Medium-Dividend	-1.1%	-0.5% ***		
Low-Dividend	-0.3%	0.5% **		
Zero-Dividend	1.7%	2.8% ***		
Panel C. Feb. 27-Mar. 5, 2003 Event Window				**Description of Event 3**
High-Dividend	0.3%	1.0% ***	-0.5%	Bush plan Introduced into House. House undertakes first hearing on Bush Plan.
Medium-Dividend	-0.3%	0.0%		
Low-Dividend	-0.8%	-0.3%		
Zero-Dividend	-0.4%	0.5%		
Panel D. Mar. 25-31, 2003 Event Window				**Description of Event 4**
High-Dividend	-3.2%	1.4% ***	-4.4%	After little progress made in March, Chairman Thomas floats plan that would cut dividends and capital gains to 8 and 18 precent, respectively.
Medium-Dividend	-2.5%	1.2% ***		
Low-Dividend	-4.0%	-0.1%		
Zero-Dividend	-1.9%	2.6% ***		
Panel E. Apr. 28-May 2, 2003 Event Window				**Description of Event 5**
High-Dividend	1.8%	0.2%	1.8%	Chairman Thomas updates plan to change dividend and capital gains to 5 and 15 percent, respectively.
Medium-Dividend	1.9%	0.2%		
Low-Dividend	0.9%	-0.6% ***		
Zero-Dividend	1.2%	-0.1%		
Panel F. May 6-12, 2003 Event Window				**Description of Event 6**
High-Dividend	0.6%	2.1% ***	-1.3%	Ways and Means passes Chairman Thomas' 5 and 15 percent plan. House passes this plan.
Medium-Dividend	-0.1%	0.9% ***		
Low-Dividend	-1.2%	0.0%		
Zero-Dividend	-0.2%	1.3% **		

Table 5 - Continued

Portfolio	Value-Weighted Portfolios			
	1 Cumulative Return	2 CAR	3 Cumulative Market Return	
Panel G. May 13-19, 2003 Event Window				**Description of Event 7**
High-Dividend	-1.1%	0.2%	-1.3%	Senate passes alternative plan that would make dividend taxes zero for one year.
Medium-Dividend	-1.0%	-0.1%		
Low-Dividend	-1.2%	-0.1%		
Zero-Dividend	-0.6%	0.9% *		
Panel H. May 21-28, 2003 Event Window				**Description of Event 8**
High-Dividend	3.1%	1.1% ***	2.1%	Chairman Thomas adds sunset provision to his 5 and 15 percent plan. This passes House and Senate.
Medium-Dividend	1.8%	-0.2%		
Low-Dividend	1.2%	-0.6% **		
Zero-Dividend	2.4%	0.8% *		
Panel I. Mean Return Across All Event Windows				
High-Dividend	0.0%	0.9% ***	-0.7%	
Medium-Dividend	-0.2%	0.3% **		
Low-Dividend	-0.9%	-0.2%		
Zero-Dividend	-0.1%	1.0% **		

This table presents the results from the eight event windows leading up to the adoption of the Jobs and Growth Tax Relief Reconciliation Act of 2003 (the Act) . In addition, Panel I. presents the mean return across all event windows. CARs are calculated by estimating the following equations at the portfolio level:

$r_{i,t} - r_{F,t} = \propto + \beta_{i,t}^{M}(r_{M,t} - r_{F,t}) + \varepsilon_{i,t}$

and

$AR_{i,t} = (r_{i,t} - r_{F,t}) - (\bar{\alpha} + \bar{\beta}_{i,t}^{M}(r_{M,t} - r_{F,t}))$

$r_{i,t}$ is the value-weighted return for portfolio *i* on day *t*. The variable $r_{F,t}$ is defined as the risk-free rate of return on day *t*, while $r_{M,t}$ is the value-weighted market return on day *t*. $AR_{i,t}$, the daily abnormal return, is cumulated over the five-day window for event k to form $CAR_{i,k}$.The t-stat used to calculate the statistical significance of the CARs is:

$$CAR_{i,k}/(\frac{SD_i}{\sqrt{n_k}})$$

where $CAR_{i,k}$ is the cumulative abnormal return for portfolio *i* from event window *k*, SD_i is the standard deviation of the beta calculation for portfolio *i* from the estimation period, and $\sqrt{n_k}$ is the square root of the number of days in event *k*s window. In Panel I., $CAR_{i,k}$ is the mean cumulative return of 8 all events and $\sqrt{n_k}$ is the square root of the number of events.

***, **, * correspond to p-values of 0.01, 0.05, and 0.10 respectively.

Table 6

Comparison of Event and Non-Event CARs by Dividend Portfolio - Single Factor Model

Portfolio	Value-Weighted Portfolios			Portfolio	Value-Weighted Portfolios			
	Cumulative Return (Percent)	CAR	Cumulative Market Return		Cumulative Return (Percent)	CAR	Cumulative Market Return	Difference in CARs
Panel A. Mean Return Across All Event Windows				**Panel B. Mean Return Across Non-Events**				**Panel C. Compare A and B.**
High-Dividend	0.0%	0.9% ***	-0.7%	High-Dividend	-0.4%	0.1%	-0.3%	0.8% ***
Medium-Dividend	-0.2%	0.3% **		Medium-Dividend	-0.4%	-0.2% ***		0.5% ***
Low-Dividend	-0.9%	-0.2%		Low-Dividend	-0.3%	0.0%		-0.2%
Zero-Dividend	-0.1%	1.0% **		Zero-Dividend	-0.4%	0.3% *		0.7% **

This table compares the mean return from the event windows to the mean return across the non-event window. Panel A. is from Table 4 Panel I. It is included in this table to aid comparison of event and non-event windows. Panel B. shows CARs for all 5-day windows that do not overlap with event windows going back one year from the date the Jobs and Growth Tax Relief Reconciliation Act of 2003 (the Act) was signed (May 2002 to May 2003). Panel C. compares the coefficients from Panels A. and B.

Cumulative abnormal returns (CARs) are calculated by estimating the following equations at the portfolio level:

$$r_{i,t} - r_{F,t} = \propto + \beta_{i,t}^{M}(r_{M,t} - r_{F,t}) + \varepsilon_{i,t}$$

and

$$AR_{i,t} = (r_{i,t} - r_{F,t}) - (\tilde{\alpha} + \bar{\beta}_{i,t}^{M}(r_{M,t} - r_{F,t)})$$

$r_{i,t}$ is the value-weighted return for portfolio *i* on day *t*. The variable $r_{F,t}$ is defined as the risk-free rate of return on day *t*, while $r_{M,t}$ is the value-weighted market return on day *t*. $AR_{i,t}$, the daily abnormal return, is cumulated over the five-day window for event k to form $CAR_{i,k}$.The t-stat used to calculate the statistical significance of the CARs is:

$$CAR_{i,k} / (\frac{SD_i}{\sqrt{n_k}})$$

where $CAR_{i,k}$ is the cumulative abnormal return for portfolio *i* from event window *k*, SD_i is the standard deviation of the beta calculation for portfolio *i* from the estimation period, and $\sqrt{n_k}$ is the square root of the number of events.

To calculate whether there is a difference between the event and non-event windows, I use a t-stat designed to test unequal sample sizes but with equal variances. This t-stat is calculated using:

$$\frac{CAR_{i,event} - CAR_{i,non-event}}{SD_i * \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

where $CAR_{i,event}$ is the mean return of the 8 event windows for portfolio *i*, $CAR_{i,non-event}$ is the mean return of the 37 non-event windows for portfolio *i*, SD_i is the standard deviation of the beta calculation for portfolio *i* from the estimation period, $n1$ is 8 (for the 8 event windows) and $n2$ is 37 (for the 37 non-event windows).

***, **, * correspond to p-values of 0.01, 0.05, and 0.10 respectively.

Table 7
Multivariate Test of European Firms' Reaction to the Jobs and Growth Tax Relief Reconciliation Act of 2003 (Event Windows Only)

		Dependent Variable		
	Pred. Sign	*CAR*		
		Estimate	p-Value	
Intercept	±	-0.010	0.50	
Dividend Yield	+	0.148	<.01	***
ZeroDividend		0.008	<.01	***
Size	-	-0.001	0.18	
Market-to-Book	-	0.002	0.03	**
Country Fixed Effects		Yes		
Industry Fixed Effects		Yes		
Observations		11,920		
Adj. R^2		0.8%		

The dependent variable, *CAR,* is the firm's cumulative abnormal return for each event window, as defined in Table 3. *Dividend Yield* is calculated as 2002 dividends per share divided by end of 2002 stock price. *ZeroDividend* is 1 if the firm paid no dividends in 2002, and 0 otherwise. *Size* is the log of market value of equity at the end of the firms most recent fiscal year. *Market-to-Book* is the market value of equity divided by book value of equity at the end of the firms most recent fiscal year. Industry is defined as the first two digits of a firm's SIC code. Standard errors are clustered at the firm level.
***, **, * correspond to p-values of 0.01, 0.05, and 0.10 respectively.

Table 8
Multivariate Test of European Firms' Reaction to the Jobs and Growth Tax Relief Reconciliation Act of 2003 (Event and Non-Event Windows)

		Dependent Variable		
	Pred. Sign	*CAR*		
		Estimate	p-Value	
Intercept	±	0.031	0.38	
DividendYield	+	-0.062	0.18	
Event	+	0.007	<.01	***
*DividendYield*Event*	+	0.146	<.01	***
ZeroDividend	±	0.008	0.22	
*ZeroDividend*Event*		-0.002	0.86	
Size	-	-0.001	0.49	
Market-to-Book	-	0.000	0.89	
Country Fixed Effects		Yes		
Industry Fixed Effects		Yes		
Observations		50,524		
Adj. R^2		0.0%		

The dependent variable, *CAR,* is the firm's cumulative abnormal return for each of the eight event and 37 non-event windows, as defined in Table 3.
Dividend Yield is calculated as 2002 dividends per share divided by end of 2002 stock price. *Event* is equal to one if the CAR relates to one of the 8 events increasing the likelihood of the Jobs and Growth Tax Relief Reconcilation Acts (the Act) passage, and is zero otherwise. *ZeroDividend* is 1 if the firm paid no dividends in 2002 and 0 otherwise.
Size is the log of market value of equity at the end of the firms most recent fiscal year. *Market-to-Book* is the market value of equity divided by book value of equity at the end of the firms most recent fiscal year. Industry is defined as the first two digits of a firm's SIC code. Standard errors are clustered at the firm level.
***, **, * correspond to p-values of 0.01, 0.05, and 0.10 respectively.

Table 9
Descriptive Statistics For the Nonintegrated European Sample

Panel A - Descriptive Statistics

Variable	Sample Size	Mean	Median	Std. Dev.	25th	75th
CAR	3,928	0.007	0.001	0.064	-0.022	0.028
DividendYield	3,928	0.024	0.019	0.027	0.000	0.040
ZeroDividend	3,928	0.379	0.000	0.485	0.000	1.000
Size	3,928	5.057	4.853	1.717	3.778	6.105
Market-to-Book	3,928	2.021	1.471	1.727	0.887	2.339

Panel B - Pearson Correlations

	CAR	*DividendYield*	*ZeroDividend*	*Size*
CAR				
DividendYield	**-0.0601**			
ZeroDividend	**0.1196**	**-0.6943**		
Size	**-0.0564**	**0.1932**	**-0.3789**	
Market-to-Book	0.0080	**-0.0860**	0.0172	**0.2521**

Panel A reports descriptive statistics for firms from nonintegrated European countries. These firms are from Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Finland, Greece, Hungary, Iceland, Latvia, Lithuania, Luxembourg, Malta, Norway, Poland, Portugal, Romania, Russia, Slovak Republic, Slovenia, Spain, Sweden, Turkey. There are 491 firms in the sample.
CAR is calculated as the cumulative return for each of the eight event windows, as defined in Table 3. *Dividend Yield* is calculated as 2002 dividends per share divided by end of 2002 stock price. *ZeroDividend* is 1 if the firm paid no dividends in 2002, and 0 otherwise. *Size* is the log of market value of equity at the end of the firms most recent fiscal year. *Market-to-Book* is the market value of equity divided by book value of equity at the end of the firms most recent fiscal year.
Panel B reports the Pearson correlations. Correlation coefficients that are significantly different from zero at less than 5% level are presented in bold.

Table 10
Comparison of Integrated and Nonintegrated Firm's Reaction to the Jobs and Growth Tax Relief Reconciliation Act of 2003

		Dependent Variable		
	Pred. Sign	*CAR*		
		Estimate	p-Value	
Intercept	±	-0.005	0.71	
NonIntegrated	±	0.016	0.10	
Dividend Yield	+	0.149	<.01	***
*NonIntegrated*Dividend Yield*	-	-0.086	0.14	
ZeroDividend		0.008	<.01	***
*NonIntegrated*ZeroDividend*		0.006	0.17	
Size	-	-0.001	0.07	*
*NonIntegrated*Size*	±	0.001	0.64	
Market-to-Book	-	0.001	0.04	**
*NonIntegrated*Market-to-Book*	±	-0.001	0.16	
Country Fixed Effects		Yes		
Industry Fixed Effects		Yes		
Observations		15,848		
Adj. R^2		1.0%		

The dependent variable in both columns, *CAR* , is the firm's cumulative abnormal return for each event window, as defined in Table 3.
NonIntegrated is equal to one if the firm is headquartered in a country that is not integrated with the U.S., and zero otherwise. *Dividend Yield* is calculated as 2002 dividends per share divided by end of 2002 stock price. *ZeroDividend* is 1 if the firm paid no dividends in 2002, and 0 otherwise. *Size* is the log of market value of equity at the end of the firms most recent fiscal year. *Market-to-Book* is the market value of equity divided by book value of equity at the end of the firms most recent fiscal year. Industry is defined as the first two digits of a firm's SIC code. Standard errors are clustered at the firm level.
***, **, * correspond to p-values of 0.01, 0.05, and 0.10 respectively.

Table 11
Descriptive Statistics For the U.S. Sample

Panel A - Descriptive Statistics

Variable	Sample Size	Mean	Median	Std. Dev.	25th	75th
CAR	28,780	0.007	-0.001	0.081	-0.030	0.032
DividendYield	28,780	0.007	0.000	0.015	0.000	0.007
ZeroDividend	28,780	0.702	1.000	0.457	0.000	1.000
Size	28,780	5.729	5.765	1.949	4.310	7.057
Market-to-Book	28,780	2.477	1.834	2.711	1.078	3.133

Panel B - Pearson Correlations

	CAR	*DividendYield*	*ZeroDividend*	*Size*
CAR				
DividendYield	**-0.0279**			
ZeroDividend	**0.0644**	**-0.7430**		
Size	**-0.0326**	**0.2342**	**-0.3802**	
Market-to-Book	-0.0024	**-0.0625**	**0.0171**	**0.2597**

Panel A reports descriptive statistics for the 3,602 U.S. firm's in my sample.
CAR is calculated as the cumulative return for each of the eight event windows, as defined in Table 3. *Dividend Yield* is calculated as 2002 dividends per share divided by end of 2002 stock price. *ZeroDividend* is 1 if the firm paid no dividends in 2002, and 0 otherwise. *Size* is the log of market value of equity at the end of the firms most recent fiscal year. *Market-to-Book* is the market value of equity divided by book value of equity at the end of the firms most recent fiscal year.
Panel B reports the Pearson correlation. Correlation coefficients that are significantly different from zero at less than 5% level are presented in bold.

Table 12
Comparison of U.S. and Integrated European Firm's Reaction to the Jobs and Growth Tax Relief Reconciliation Act of 2003

	Pred. Sign	Dependent Variable *CAR* Estimate	p-Value	
Intercept	±	-0.008	0.52	
USFirm	±	0.008	0.50	
DividendYield	+	0.161	<.01	***
*USFirm*DividendYield*		0.051	0.31	
ZeroDividend		0.007	0.02	**
*USFirm*ZeroDividend*		0.008	0.01	**
Size	-	-0.001	0.03	**
*USFirm*Size*	±	0.001	0.24	
Market-to-Book	-	0.001	0.06	*
*USFirm*Market-to-Book*	±	-0.001	0.03	**
Country Fixed Effects			No	
Industry Fixed Effects			Yes	
Observations			40,700	
Adj. R^2			0.8%	

This table compares U.S. and European firm's reactions to the adoption of the Jobs and Growth Tax Relief Reconciliation Act of 2003 (the Act).
The dependent variable, *CAR,* is the firm's cumulative abnormal return for each event window, as defined in Table 3.
USFirm is a dummy variable equal to one if the firm is headquartered in the U.S., and zero otherswise. *Dividend Yield* is calculated as 2002 dividends per share divided by end of 2002 stock price. *ZeroDividend* is 1 if the firm paid no dividends in 2002 and 0 otherwise. *Size* is the log of market value of equity at the end of the firms most recent fiscal year. *Market-to-Book* is the market value of equity divided by book value of equity at the end of the firms most recent fiscal year. Standard errors are clustered at the firm level.
***, **, * correspond to p-values of 0.01, 0.05, and 0.10 respectively.

Appendix A

Table A.1 - Value of U.S. holdings of foreign securities, by country, as of December 31, 2003

	Foreign Equity Held by U.S. Institutions ($Billions)	Country-Level Breakdown of Foreign Equity Owned by U.S. Institutions[1]	Percent of Total Foreign Stock Market owned by U.S. Institutions	Percent of Foreign Stock Market Owned by Taxable U.S. Investors[3]
10 European Countries [2]				
Austria	4	0.2%	7%	0.9%
Belgium	11	0.5%	6%	0.8%
Denmark	10	0.5%	8%	1.0%
France	131	6.3%	10%	1.3%
Germany	103	5.0%	10%	1.3%
Ireland	22	1.1%	26%	3.3%
Italy	39	1.9%	6%	0.8%
Netherlands	116	5.6%	24%	3.0%
Switzerland	118	5.7%	16%	2.0%
UK	421	20.3%	17%	2.2%
	975	46.9%		
Other Countries				
Japan	255	12.3%	8%	1.0%
Canada	149	7.2%	17%	2.2%
Rest of World	700	33.7%		
Total	2,079	100.0%		

This table presents the value of foreign securities, by country, held by U.S. institutional investors and comes from the Treasury International Capital report dated December 31, 2003. Results are similar if the December 31, 2001 report is used. The report is available at www.treas.gov/tic/. Regarding holdings of individual investors the report notes "no private individuals were surveyed. However, most holdings of private individuals were captured by the survey, as these investments are typically entrusted to U.S.-resident custodians for safekeeping or funneled through U.S. mutual funds or other large investment pools."

[1]This column shows the ratio of equity owned in a foreign country by U.S. institutions to total foreign equity owned by all U.S. institutions. For example, of all foreign equity held by U.S. institutions, 0.2% is held in equities from Austria ($4 billion/$2,079 billion).

[2]These 10 European countries make up the sample for this paper's main empirical tests.

[3]This percentage is calculated as the ratio of taxable U.S. investor holdings to foreign market capitalization. As discussed in the Survey Design section of the 2003 TIC report, all holdings data is collected from institutional investors. As a result, taxable U.S. investor holdings are calculated by mulitplying total holdings by the percentage of institutional ownership prior studies have found to be taxable (12.7%, see Blouin et al. (2011)). For example, U.S. institutions hold 17% of U.K. stock. If this percentage is multiplied by the expected level of tax-exempt holders (12.7%), U.S. taxable investors hold 2.2% of U.K. stock (.17*0.127).

Appendix A

Table A.2 -Value of Foreign Holdings of U.S. Securities, by Country, June 30, 2003

	U.S. Equity Held by Foreign Institutions ($ Billions)	Country-Level Breakdown of U.S. Equity Owned by Foreign Institutions[1]
10 European Countries [2]		
Austria	7	0.4%
Belgium	15	1.0%
Denmark	13	0.8%
France	42	2.7%
Germany	72	4.6%
Ireland	38	2.4%
Italy	28	1.8%
Netherlands	110	7.0%
Switzerland	104	6.6%
UK	194	12.4%
	623	39.8%
Other Countries		
Japan	135	8.6%
Canada	179	11.4%
Rest of World	627	40.1%
Total	1,564	100.0%

This table presents the value of U.S. securities held by foreign institutional investors and comes from the Treasury International Capital report dated June 30, 2003 and is available at www.treas.gov/tic/. The report states "foreign official institutions consist primarily of foreign national government and multinational official institutions involved in the formulation of international monetary policy, but also include national government-sponsored investment funds and other national government."

[1]This column shows the ratio of U.S. equity owned by a foreign country to total U.S. equities owned by all foreign countries. As an example, of all U.S. equities owned by foreign countries, 0.4% is held in Austria ($7 billion/$1,564 billion).

[2]These 10 European countries make up the sample for this paper's empirical tests.

Appendix A

Table A.3 -Impact of Country Specific Tax Rate Cuts on The Integrated Dividend Tax Rate

	1	2	3	4	5	6	7	8
	Total Value of Domestic Stock Market ($ Billions)	Percent of Stock Market Held by Taxable Investors	Top Domestic Tax Rate on Dividends at the end of 2002	Average Dividend Tax Rate of Domestic Market	Integrated Market Dividend Tax Rate at the end of 2002	Integrated Market Dividend Tax Rate after 60% Cut in U.S.	Integrated Market Dividend Tax Rate if 60% Cut in U.K.	Integrated Market Dividend Tax Rate if 100% Cut in Austria
U.S.	17,941	41%	45%	18%	13.1%	6.1%	13.1%	13.1%
Austria	57	88%	25%	22%	0.1%	0.1%	0.1%	0.0%
Belgium	183	91%	15%	14%	0.1%	0.1%	0.1%	0.1%
Denmark	125	82%	43%	35%	0.2%	0.2%	0.2%	0.2%
France	1,310	82%	36%	29%	1.5%	1.5%	1.5%	1.5%
Germany	1,030	82%	26%	21%	0.9%	0.9%	0.9%	0.9%
Ireland	85	73%	42%	31%	0.1%	0.1%	0.1%	0.1%
Italy	650	88%	13%	11%	0.3%	0.3%	0.3%	0.3%
Netherlands	483	72%	25%	18%	0.3%	0.3%	0.3%	0.3%
Switzerland	738	80%	41%	33%	1.0%	1.0%	1.0%	1.0%
UK	2,476	82%	25%	21%	2.0%	2.0%	0.8%	2.0%
	25,078				**19.6%**	**12.6%**	**18.3%**	**19.5%**

Column 1 - value of domestic stock market comes from the Treasury International Capital report dated June 30, 2003. The report is available at www.treas.gov/tic/.
Column 2 - the percentage of stock market held by taxable investors is calculated as one minus the percentage of the stock market held by tax-exempt institutions. The percentage of stock held by tax-exempt institutions is calculated as the percentage of stock held by institutions multiplied by the percentage of institutional holdings that are tax-exempt. The country-level percentage of stock held by institutions is taken from Ferreira and Matos (2008). The percentage of institutional holdings that are tax-exempt, 87.3%, is taken from Blouin et al. (2011).
Column 3 - this tax rate comes from the OECD tax database available at www.oecd.org/fr/ctp/analysedespolitiquesfiscales/oecdtaxdatabase.htm#B_PersonalTaxes.
Column 4 - calculated as the percentage of stock market held by taxable investors (column 2) multiplied by the top domestic dividend tax rate (column 3).
Column 5 - calculated as the average dividend tax rate of the domestic market (column 4) multiplied by the ratio of the domestic stock market to the total integrated market. For example, the U.S. makes up 71.5% of the integrated market (17,941/25,078). This percentage multiplied by the average tax rate of the domestic market equals 13.1%.
Column 6 - this column reflects the impact of the 60% U.S. dividend tax rate cut in 2003 on the integrated dividend tax rate.
Column 7 - this column reflects the impact on the integrated dividend tax rate if the U.K. had cut their dividend tax rate by 60% in 2003. The U.K. is chosen because it is the second largest stock market in the integrated market.
Column 8 - this column reflects the impact on the integrated dividend tax rate if Austria eliminated their dividend tax rate. Austria is chosen because it is the smallest stock market in the integrated market.

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EDUCATION

University of Arizona, Eller College of Management
Ph.D. in Management – Accounting Concentration with minor in Finance, 2013 (expected)

Brigham Young University, Marriott School of Management
Master of Accountancy – Taxation, 2006
Bachelor of Science – Accountancy, 2006
Minor in English, 2006

RESEARCH

Interests:
Influence of taxes on asset prices, international stock portfolio choices, and valuation of foreign earnings.

Working Papers:
Dissertation - **"Is the Average Dividend Tax Rate of Investors Capitalized Into Expected Returns?"**
Dissertation Committee - Dan Dhaliwal (Chair), Chris Lamoureux (Finance), and Kirsten Cook

- Accepted for presentation at the *Journal of the American Tax Association* Conference (Feb. 2013)

Abstract - Capital asset pricing models predict that the dividend tax capitalized into expected returns reflects the average tax rate of investors in a market (average rate theory). To date this theory has only limited empirical support. To test this theory, I argue stock markets in developed European countries and the U.S. can be considered an integrated market, where the dividend tax capitalized reflects the average rate of investors across these countries. If this is the case, when the top U.S. dividend tax rate was cut by 60% in 2003, the average rate theory would predict a decrease in the dividend tax capitalized in Europe, similar to what has been found in the U.S. (Dhaliwal et al. 2007). In contrast, firms in less integrated European countries should not react to the U.S. dividend tax cut. Finally, I test a prediction from Desai and Dharmapala (2011) that given stock market integration between the U.S. and developed European countries the reaction to the dividend tax cut should be the same. I document results consistent with these predictions. The evidence in this study provides support for the average rate theory.

Works in Progress:
"Dividend Tax and Foreign Investment in U.S. Equity" (with Dan Dhaliwal, University of Arizona; Zafer Yuksel, Tulane University)
Status – Preliminary data analysis complete and draft written.

Description – In this paper we examine whether mutual funds in Luxembourg (a tax haven country) used tax-motivated swap transactions to avoid U.S. dividend withholding tax. Specifically, we predict that after a 2008 U.S. Senate investigation reduced the availability of these transactions, Luxembourg mutual funds will hold less high dividend paying U.S. securities. We don't expect a similar trend for non-Luxembourg mutual funds because they were less likely to be engaged in these transactions. We find evidence consistent with these predictions. This paper, therefore, adds to the limited literature on how tax havens

enable investors to avoid U.S. taxes. It also shows that foreign investment in U.S. equities is influenced by U.S. dividend tax rates.

"Gambling on the Future: Dominant Local Beliefs on Gambling and Financial Misreporting" (with Dane Christensen, University of Arizona; Keith Jones, George Mason University)
Status – Data analyzed, writing stage.

Description – The fraud triangle is often used to explain why managers engage in intentional misreporting. Although great progress has been made in explaining the incentives and opportunities that lead to misreporting, we still have a very limited understanding of the attitudes or rationalizations involved (Trompeter et al. 2012). We help fill this void by investigating whether dominant local attitudes toward gambling help explain aggressive financial reporting. Since gambling and aggressive accounting are both risky behaviors based on expectations of future success, we predict that in places where gambling is more socially acceptable, managers will be more likely to engage in aggressive accounting, which leads to a higher likelihood of misreporting over time. Consistent with this prediction, we find that accounting irregularities are more common where gambling is more socially acceptable. Among a sample of restatement firms, we also find irregularities are more common than unintentional errors in places where gambling is more socially acceptable. Lastly, we find that irregularities in gambling areas are more common when firms experienced a small loss. This result is consistent with prospect theory, which predicts that when facing a sure loss, individuals become risk-seeking (i.e., more likely to gamble with aggressive accounting to solve an immediate need) to avoid the loss. However, when losses become large, the ability to hide bad news may become too difficult. Consistent with this argument, we do not find that irregularities are more common in gambling areas for firms facing large losses.

"A Tax Based Explanation for the Lower Valuation of Foreign Earnings" (with Stephen Lusch, University of Arizona)
Status – Data analysis.

Description – Callen at al. (2005) show that investors value foreign earnings less than domestic earnings because there is less public information about foreign operations. We argue another reason for valuing foreign earnings less than domestic earnings is that additional tax, which has not been recorded in the financial statements, may be due to the U.S. government when the foreign earnings are repatriated.

TEACHING

University of Arizona
Instructor – Introduction to Financial Accounting – winter 2008 (undergraduate)
4.3/5 – average course rating unavailable (approximately 50 students)

Instructor – Introduction to Financial Accounting – fall 2010 (undergraduate)
3.8/5 – average course rating 3.9 (approximately 220 students)

Currently developing Accounting for Income Tax class (ASC 740) with Tom Klein, University of Arizona lecturer and former Deloitte partner

PROFESSIONAL EXPERIENCE

PricewaterhouseCoopers LLP
Tax Associate (Orange County, CA) – August 2006 to May 2008
Intern (Orange Country, CA) – January 2005 to April 2005
Certified Public Accountant – California, 2008 to present

HONORS AND AWARDS

2012 PricewaterhouseCoopers INQuires grant (with Kirsten Cook)
Brigham Young University, Marriott School of Management – Cum Laude (2006)

CONFERENCE PRESENTATIONS

Brigham Young Accounting Symposium, Provo, UT, 2012
Presenter, "Is the Average Dividend Tax Rate of Investors Capitalized Into Expected Returns?"

University of Arizona, Tucson, AZ, 2012
Presenter, "Is the Average Dividend Tax Rate of Investors Capitalized Into Expected Returns?"

American Accounting Association Annual Meeting, Washington, D. C., 2012
Discussant, "Disclosure Decisions Surrounding Permanently Reinvested Foreign Earnings"

CONFERENCES ATTENDED

American Accounting Association Annual Meeting, Washington, D. C., 2012
American Tax Association Meeting, New Orleans, LA, 2012
American Tax Association Meeting, Washington, D. C., 2011
Brigham Young University Accounting Research Symposium, Provo, UT, 2009 – 2012

SERVICE

American Accounting Association (member since 2010)
Instructor, SAS Programming Boot-Camp Coordinator (for Accounting and Finance students), 2012
Assistant Varsity Coach, Scout Team 334, May 2011 – Present